to force these gases down to the hearth of the kiln the dampers si
and 52 are opened more or less.C[1])

By forcing the hot gases to circulate through piles of briquets, the frictional resistance to the flow of the gases is increased; it becomes necessary, accordingly, to increase the pressure of the blower, forcing the primary air in below the grate of the gas producer and the gas into the furnace, and to increase the height of the chimney. At the same time, the clay-filled joints, which are not air-tight, tend to prevent any such increase in the pressure from the blower.

In order to overcome this difficulty, Groendal forces a stream of air under the cars in the kiln for the purpose of cooling them. It is probable that supplementary air from this source enters the chamber of the kiln and has a tendency to turn the *hot gases back to the roof. As a consequence of this, these kilns must be . made very long (from 50 to 70 m).

In his design of a tunnel kiln, Groendal commits the obvious error of carrying away the waste gases by ports in the roof of the tunnel. By reason of this location of the waste-gas outlet, the train of cars carrying the briquets is plunged into a pocket of cold gases. The second fault which he commits consists of seeking to force the hot gases to pass through the pile of briquets for the entire length of the tunnel. This is very difficult and in order to accomplish it the inventor limits the charge of brick upon the cars to two tiers.

The author believes that, in the design of the tunnel kiln, it is necessary to place one feature of the problem above all the others. It is not possible to force the stream of hot gases to pass through the piles of briquets, which are 50 m long. It is more advan-tageous to heat the briquets by a descending current of hot gases.

The difference between these two methods—that of Groendal

and that proposed by the author—may be studied by comparing the cross-sections of the tunnel kiln designed by Groendal (Fig. 125) and the cross-section as corrected by the author (Fig. 126). Groendal placed a flat roof at a distance of 150 mm above the

(1) It is claimed that the manipulation of the dampers s_s and s_4 improves the preheating of the air by forcing it down on the hearth of the kiln. These dampers are evidently useless for this purpose, as the cold air will naturally seek the lowest portion of the chamber.